

STATENS ETNOGRAFISKA MUSEUM

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SMÄRRE MEDDELANDEN

N:r 15

WIRE-DRAWING, ESPECIALLY IN AFRICA

BY

K. G. LINDBLÖM

STOCKHOLM 1939

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*This essay has been published by financial
support granted by the Swedish Government
and the Trustees of the late Baron Carl von
Platen's Foundation.*

Printed in Sweden

TRYCKERI AKTIEBOLAGET THULE
STOCKHOLM 1939

300061

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I. NOTES ON THE TECHNIQUE

The art of working in metals, iron above all, is of course known practically throughout the entire African continent — with exception, however, for Pygmies and Bushmen as regards the extraction of iron from the ore — while, on the other hand, such a technical detail of metallurgy as wire-drawing appears to be of a relatively limited occurrence. It may therefore — among other things as a contribution to our knowledge of how different culture elements are distributed over that continent — be of a certain interest to determine its geographical distribution and, so far as is possible, also the circumstances that caused it. In conclusion I also propose to touch upon the occurrence of wire-drawing outside Africa.

In 1926 I published an article on this subject, but that was in the Swedish language and appeared in a journal¹ which only rarely deals with extra-European subjects, for which reason it is to be supposed that it is very little, if at all, known to students of African ethnology outside Sweden. In the years that since then have passed I have collected a great deal of additional material as regards wire-drawing in Africa, and this has led to my now having somewhat revised my in my earlier essay expressed opinion as to the origin of wire-drawing in Negro-Africa. One or two instances, not earlier known to me, I have besides found in Cline, who in his work devotes a chapter to "Wire and Chain".²

The manufacture of metal thread by methods other than drawing

has no doubt been practised in many parts of Africa, from the first probably over a larger area than drawing. In the present essay I am however only dealing with wire-drawing in its proper sense, as carrying investigation further than that would prove a pretty vast undertaking, besides involving difficulties of a practical nature. Among other things it would be difficult to draw the line for what exactly should be defined as wire. For the present I therefore content myself with quite briefly mentioning that in many places wire is, or has been, manufactured by hammering and subsequent scraping, and of this I will give a few instances. In Southern Nigeria iron wire is made by hammering (*F. A. Talbot, The peoples of S. Nigeria*, III, p. 924. Oxford 1926). The Bafia, of Cameroon, obtain brass wire through trading intermediaries. Still thinner wire is produced by hammering the thick thread and then scraping it with a knife. The resulting wire is used for ornamenting calabash food bowls, and for finger-rings. (*G. Tessmann, Die Bafia*, p. 149. Stuttgart 1934). In Kavi-rondo, by hammering an iron cylinder, four-sided iron wire was made, in imitation of the *senengé* wire brought from the coast (*J. Thomson, Through Masai Land*, p. 492. London 1885). Lichtenstein mentions from the southern Bechuana tribes rings of copper wire, produced by lengthy hammering. In Egypt, in the pre-dynastic era, wire was made from metal plates (gold) which were hammered thin and cut up into narrow strips, which were then further hammered, worked with a knife, and lastly filed. In Nigeria tin wire is made, cast in moulds of plastic clay shaped on the model of straws (object exhibited in University Museum, Cambridge, d. d. R. Pearce). Frequently, from authors of whom better might be expected, nothing further can be gathered than that "wire is made", but not by what method. For example, Junod writes of the Batonga: 'Wire was formerly made by native blacksmiths, but now they buy it at Lourenço Marques, or from the Hindu traders' (*Life of a S. African tribe*, II, p. 122. Neuchatel 1913).

Wire (iron, copper, but also imported brass and, in places, silver and gold) is in Africa drawn in the same way as in Asia, and on the whole the same principle is still adhered to among the civilized peoples of Europe. It is probable that in most parts of Africa wire is nowadays drawn by thinning down the imported trade article, but manufacture which is throughout native no doubt still exists here and there.

In such cases a piece of metal is forged and beaten into a bar, which is then drawn. The tools used in this process are the following: (1) a draw-plate, or die, with one or more perforations; (2) a clip for holding the wire (i.e. in the place of pincers), often consisting of an iron device shaped like a pair of sugar-tongs, which is clamped together by pulling an iron ring over it. Occasionally this clip consists of two flat iron bars, held together by iron rings; (3) an iron wedge is sometimes inserted within the ring; and (4) an iron awl for boring up the hole, or holes, in the die. This instrument is however not always used when the die contains several holes of varying sizes. — In order to prevent the draw-plate from slipping about, it is placed in the fork of a post which is firmly driven into the ground. When thinner wire is drawn, and consequently less force is required, the clip may be wedged into the fork of the post, and the draw-plate pulled by hand. In the drawing of thin wire no support at all is occasionally used, one man then holding the clip while another pulls the die over the wire. It is even possible for a man to work the whole process single-handed, in that he clamps the wire with his foot and pulls the die towards himself, from below and upwards. Or, in places, the draw-plate may be firmly held against the soles of the feet. Wire-drawing is as a rule done by hand, but in the production of thick wire it is in certain parts (Congo) usual to work with a lever. Thick wire is heated when drawn, but the temperature is kept low when operations are mainly done by hand. Very thin wire is rubbed in grease in order to lessen friction, as otherwise it might easily break. For this purpose is, e.g., in Katanga used oil of sesame or of ground-nuts. The finished wire is rolled up into fair-sized coils. In places this is done in the course of the drawing, on a wooden roller which rotates in holes made in a forked post.

Occasionally the edges of the hole give way when the wire is drawn through it, so that the later part of the wire becomes thicker than the earlier. In order to counteract this, in such cases the wire is drawn through, first with one end foremost and then the other.

In negro-Africa wire-drawing is generally done by the tribal blacksmiths, but to this there are exceptions. In Kiziba, on Lake Victoria, for example, the blacksmiths do not work in copper or brass, but this is done by special artisans. Among the Vachokwe (Angola) some of the blacksmiths have a knowledge of wire-drawing, but frequently

this craft is in the hands of specialists. In a village visited by Schachtzabel the wire-drawer was at the same time a teacher of the art of stilt-walking!

In certain negro villages, among others the district southwest of Lake Victoria and Katanga in Belgian Congo, wire-drawing is an important home industry. A parallel to this might be said to exist in Sweden, namely the wire-drawing that is carried on in the parish of Gnosjö (county of Jönköping).

Apart from what has been said above I do not propose to enlarge upon the technicalities of wire-drawing, but confine myself to referring the reader to the following detailed accounts, viz.: from Ruanda and Katanga (Bayeke): *R. Kandt*, *Gewerbe in Ruanda*, *Zeitschr. f. Ethnol.* 1904, p. 362, figs. 80—87; *J. Czecanowski*, *Wiss. Ergebn. d. Deutsch. Zentral-Afrika-Expedition 1907—1908*, VI: 1, p. 157 (Ruanda), Leipzig 1917; *M. A. Mahieu*, *L'exploitation du cuivre par les indigènes au Katanga*, Congo 6: 2, p. 123, Bruxelles 1925, and *de Hemptinne*, *Les "Mangeurs" de cuivre du Katanga*, Congo 7: 1, p. 395. Bruxelles 1926 (H's description of the wire-drawing appears to have been copied from Mahieu, although the process of manufacture is here perhaps rather more clearly described than in the former).

The finished wire is chiefly used for making ornamental objects, such as bracelets, anklets and finger-rings, etc. In addition there is, perhaps more especially in East Africa, the manufacture of chains for a similar purpose, an art in which, in particular, the Akamba are very expert.

Among bracelets and anklets, Cline (p. 113) particularly noticed a type consisting of a core of goat hair, antelope hair or fibre, wound over with very fine metal wire. He states that this technique, of which examples have been discovered at Zimbabwe, from that place spread to the Balemba and Bavenda, as well as northward to the Wanyamwezi and westward to the Bayeke. In this treatise of mine are also recorded instances still farther north, from Karagwe and Kiziba. Bracelets of this type are also used by other tribes, even though they do not manufacture them themselves, such as, e.g., the Washambaa, among whom those bracelets are made by immigrated Wanyamwezi. See *Karasek-Eichhorn*, *Beitr. z. Kenntnis d. Waschambaa*. *Baessler-Archiv*, I, p. 165. Although not expressly mentioned by K.-E., it is

probable that the wire is drawn by those Wanyamwezi themselves. A further investigation into the distribution of this technique in East Africa would no doubt be worth while.

2. GEOGRAPHICAL DISTRIBUTION IN AFRICA

I will now proceed to an examination of the geographical distribution in Africa of wire-drawing. My investigation is mainly based upon a mass of literature that I have waded through, both ethnographical and travel accounts. To this may be added a number of instances gathered from museums. For valuable data courteously supplied me by colleagues I am especially indebted to Dr. J. Maes as regards the Congo.

According to Vernier, it seems highly probable that the ancient Egyptians manufactured true wire, very likely already in the Middle Kingdom. From that period has been recovered gold wire which, in V's opinion can only have been produced by drawing.³ "Durch Guss, durch Schmieden oder durch Zuschneiden von starken Blechstücken wurden Stäbe (sog. "Zainen") gebildet und diese durch eine Reihe immer engerer Löcher in Platten aus hartem Stein gezogen".⁴ In the time of the Middle Kingdom iron was very little known in Egypt,⁵ and it is therefore not surprising that draw-plates were made from some other material. It is probable that later on they were made of iron. Even such an early author as Wilkinson points out that the absence of archaeological finds is not to be accepted as evidence that the draw-plate was unknown in ancient Egypt, and that quite a number of handicrafts no doubt existed there although unrepresented by finds, or pictorially.⁶ This is also stressed by Ermann, particularly as regards metal-work: "For here we have another instance of the remarkable circumstance that the pictures and the models found in the tombs by preference represent relatively unimportant things while almost entirely disregarding this widely practised and highly developed art".⁷

Regarding the Egypt of later times, and of our days, I have been unable — all my hunting through the literature notwithstanding — to find a single reference to wire-drawing. It is, however, practised at least in certain towns, as, e.g., Alexandria, Cairo, Khartoum, etc. Cf. letter from A. E. Robinson, p. 23.

In modern Abyssinia, at all events among the Amhara but probably also among other peoples, blacksmiths and whitesmiths use more or less similar appliances, including a wooden draw-plate consisting of an elongated, shuttle-shaped piece of wood with a hole in the centre for drawing the wire through.⁸ As Rohrer says, it may also be of iron like that described by Stuhlmann.⁹ In Kaffa, too, are used similar wooden draw-plates (*biturru*, literally 'shuttle'): "A piece of hard wood shaped like a shuttle, or through, about six inches long and pierced in the middle".¹⁰ Here, as in Abyssinia proper, wire is drawn from gold, silver, copper, tin and bronze, and is used in filigree work and for making chains.

The above two statements regarding Abyssinia and Kaffa are the only ones I have come across where draw-plates of wood are mentioned, in Africa or anywhere else.

Rohrer (*op. cit.*, p. 113) points out that in the Amhara district whitesmithery is for the most part a foreign industry, carried on by Arabs, Indians, Armenians and Greeks, who however, have for generations been settled in the country. Heuglin, too, says that the Abyssinian goldsmiths partly consist of immigrated and naturalized Indians and Armenians.¹¹

South of Kaffa I have found no reference to wire-drawing until we reach Unyoro and the district between Lake Victoria and the east coast. From Unyoro, that is to say from a village forming the residence of Kabarega, Emin Pasha makes cursory mention of "eine Holzvorrichtung zum Ausziehen des Drahtes. Als Material sah ich sehr unreines Eisen, Kupfer und Messing in Arbeit".¹² By this, Emin presumably refers to a post driven into the ground for holding the draw-plate. Roscoe makes no mention of wire-drawing in his work "The Bakitara or Banyoro" (Cambridge 1923), nor in his monograph on the Baganda (London 1911). It is therefore possible that the wire-drawing apparatus observed by Emin was an isolated occurrence, imported by Kabarega. According to Roscoe (p. 378), the first blacksmiths in Uganda were mainly of the Banyoro tribe.

East of Lake Victoria the industry we are dealing with is known to me from the Akikuyu, Akamba, Wanyika,¹³ Wadjagga and Masai. Among them all, the draw-plate is of the same shape, viz. an iron plate with pointed or blunt ends, and holes of varying sizes. A proportion of the Kikuyu iron-workers still appear to make their own

iron wire, while the Akamba nowadays exclusively use trade wire. Both peoples call the draw-plate *uta* — probably the same word as *uta*, 'bow' — and among the Akamba this appliance has a length of ca. 2 dm. From the Akikuyu, Routledge depicts one measuring 5 by 1 inches. The clip (*ruga*) is of sugar-tong type, incircled by an iron ring into which an iron wedge is driven.¹⁴ The Akamba principally use the wire for their highest-class metal-manufactures, the fine and well-made chains of iron, copper or brass wire for which they have a high reputation among their neighbouring tribes.¹⁵

From the Wadjagga (Kilema district), Kersten, after Thornton, gives a good description. The clip is of the same type as among the Akikuyu, and the wire is used in the manufacture of ornamental chains.¹⁶ The same type of clip (*ol gamet*) is used by the Masai smiths. The draw-plate of the latter (*en gauo*) is about a foot long. "Das Ausziehen kleiner Drahtstücke wird mit der Hand gemacht, wobei ein Mann das *en gauo*, der andere die Zange fasst. Bei grösseren Arbeiten wird ersteres mit seinen beiden Spitzen in einen gabelförmigen Holzblock gekeilt, während der bereits durchgezogene Draht auf einer in zwei Gabelästen ruhenden Walze befestigt wird. Durch langsames Drehen derselben geht das Drahtziehen dann weiter. Um den Draht noch dünner zu machen, zieht man ihn das zweite mal durch ein Eisen mit kleinerem Loch".¹⁷ The Masai blacksmiths draw wire especially for the mass of ornaments worn by their women.

Although it seems we have no data available, wire is probably drawn among several more tribes between Victoria Nyanza and the Indian Ocean than those just mentioned.

A veritable centre of wire-drawing is the region between the great lakes of Central Africa. Ruanda has already been mentioned. Here iron wire is mostly produced from native raw material, while copper and brass wire is drawn from imported material in the form of thick coils (*Kandt, op. cit.*, p. 362, *Czekanowski, op. cit.*, p. 157). The die is not of plate shape, but consists of a disk with a conical swelling in the middle. It has only one hole, and, according to Kandt, is known as *injundi*, while the clip and its rings are called *igifasche* and *ruguri*, respectively.

From the Karagwe and the Kiziba, northeast of the Karagwe, the method is described and depicted by Weiss.¹⁸ As in Ruanda, the draw-plate has a conical swelling in the middle, in which are bored one or

more holes of different sizes. A strong forked post is firmly planted in the ground to serve as a holder for the draw-plate. Wire-drawing is done by the blacksmiths. A lump of iron is made red-hot and hammered into bars 20—25 cm. long and half the thickness of a finger. From each of these bars a coil of wire is produced. In reducing a length of wire 5 mm. in diameter to a diameter of 1 mm., the wire has to be drawn over 200 times. Even the 1 mm. wire is however still too thick for the bracelets and anklets of cow-tail, or goats' hair, wound over with fine metal wire, and therefore it must be further drawn to make it fit for that purpose. In this case the process described above is unnecessary, and a simpler one will be sufficient. The wooden post is not needed, the blacksmith only holding the end of the wire, secured in the clip, with one hand while with the other he pulls the draw-plate over the wire. Thus the foregoing process is reversed. Frequently two blacksmiths assist one another.

Richter points out that in the Bukoba district (which also includes Kiziba) the blacksmiths work neither in copper nor brass. For these metals there are special artisans. Copper and brass, in the form of wire, is obtained from traders. Richter gives the native names for all the accessories of wire-drawing: *tundu* (or *karitundu*), the draw-plate, which is of very soft iron; *kikwasi*, the tong-shaped iron clip used in holding the wire; *igata* (or *kata*), the spiral-shaped iron ring which is fitted around the clip; *ikombe*, the forked post, driven into the ground, into which the *tundu* is fixed in the drawing; *kusika*, to draw wire, etc.¹⁹

This conical type of draw-plate also occurs in Usindja (the Balongo tribe) on the extreme southwestern shore of Lake Victoria, where wire-drawing is an important industry in certain villages. Fine wire is here drawn from iron, brass or copper, and is used for the profusion of rings that men and women wear round their ankles. Round a narrow core of hair from cows' tails or antelopes', the exceedingly fine wire is spirally wound so that the framework is completely covered. "Der erhaltene Draht windet man auf eine dicke, horizontal gestellte Holzwellen, die in zwei oben durchbohrten Pfählen läuft. Vor dieser Welle ist ein eingekerbter Pfahl eingerammt, der das mit Löchern von verschiedenem Durchmesser versehene Zieheisen aufnimmt. So wird durch Treiben der Welle der Draht mechanisch zu immer dünneren Fäden ausgezogen".²⁰

Regarding the Barundi, Meyer states that he has been unable to ascertain whether they are acquainted with wire-drawing. Their narrow bracelets and anklets, he says, are wound with imported wire.²¹ This does not, however, preclude that in earlier times they themselves drew wire, or that wire-drawing may still be practised here and there. According to Cline, who for his authority has van der Burgt (whose work I have not available), some of the Barundi imitate the craft of the Bavira on their west, but most of them have no knowledge of it.²² It may be added that in his description of wire-drawing among the Wanyamwezi it is stated by Stern that the "Vadusi" use the same method.²³ By this he is no doubt referring to the Batusi, i.e. the dominant tribe of Urundi.

Professor Maes has been kind enough to give me some information as regards wire-drawing among the Bafulero, western neighbours of the Barundi, and inhabiting the region bordering in the northwest on the north end of Lake Tanganyika. From this tribe the Musée du Congo Belge at Tervueren possesses a draw-plate (*buta*) and a pair of pincers (*muganga*) together with copper wire (known as *sambo* or *tsuma*, according to its thickness), collected in 1910 from the neighbourhood of the station of Uvira.²⁴ When Cline (p. 109) mentions that the Bavira, "to the west of the Barundi", draw fine wire and copper wire from European trade stuff, this probably refers to the Bafulero, in the neighbourhood of Uvira. C's authority is van der Burgt (*op. cit.*) but, as already mentioned, I have not the latter's work available. The Bavira, a tribe which cannot very well come into the question in this connection, live in the Ituri district to the west of Lake Albert.

Professor Maes has further informed me that since 1909 the Tervueren Museum possesses draw-plates for iron and copper wire, a pair of pincers, and a reamer for draw-plates from the Baniabungu, neighbours of the Bafulero and on their northwest, inhabiting the western bank of the Rufiji northwards as far as the southwest end of Lake Kiwu.

From Usindja and Urundi it is not far to Unyamwezi, where wire is drawn from the imported trade article (generally iron, but also copper and brass), in particular for the manufacture of anklets wound over with very fine wire.²⁵ The clip, which consists of a doubled-up piece of iron, is known as *muganga*, and the draw-plate (at any rate in

the south) as *ikombc*.²⁶ From Unyamwezi, Speke depicts a clip in the form of a tong-shaped, cleft piece of iron, girded with two rings.²⁷ The method employed varies slightly, according to Stern, in the northern and southern parts of the country. In the south, for example, it appears that a lever is used.

Regarding the Wanyamwezi of Katanga, and the region between Lakes Nyasa and Bangweolo, see below.

Concerning the remainder of Tanganyika Territory I am without information,²⁸ especially as regards its eastern parts, excepting the plateau between Lakes Tanganyika and Nyasa. Wire-drawing is carried on in this region among others by the Konde, a tribe settled on the north end of Lake Nyasa, and by the Wakinga northeast of the lake, from whom Fülleborn gives a fairly exhaustive account. The draw-plate of the Wakinga consists of a plate with several holes, while the Konde and other tribes living on the Tanganyika-Nyasa plateau appear to be using a cone with only one hole, and in form somewhat divergent from the type of cone with which we have already become acquainted.²⁹

From Moliro, on Lake Tanganyika near its southwestern end — in the Congo (Katanga) but on the Rhodesian border — Lemaire describes a wire-drawer at work. No lever is here used. I have not Lemaire's essay available,³⁰ but Professor Maes has been kind enough to inform me that the operator was a man belonging to the Baluba tribe, and also to send me a couple of photographs taken in 1898 at Moliro by Lemaire (in the possession of the Tervueren Museum). These photographs show a post planted in the ground, with a hollow at the top (fig. 2). The draw-plate, which appears to be rather flat and pointed at both ends, is in the usual way pressed against the post during the process of drawing, in which a clip is used.

From the Babemba (Bawemba) between the south end of Lake Tanganyika and Lake Mweru (the Baraka region) the museum at Tervueren, according to Prof. Maes, since 1936 possesses two iron draw-plates, and since 1902 two such from the Mpweto (Pweto) region on the north end of Lake Mweru. The natives inhabiting that district are, according to Maes' map, Bashila or Batabwa.³¹

Southwest of Lake Mweru we find the Bayeke, and with that we have passed into the Katanga region, another centre for wire-drawing whence several data are at hand.

The Bayeke are immigrants from the eastern side of Tanganyika and became the ruling tribe between Luapula and Lualaba. In their original country they were workers in iron, while in their new domicile they devoted themselves to working in copper. Their export of the latter metal was mainly directed westwards, to Angola. They entered into communication with the Portuguese, and many of their trading expeditions reached the Atlantic coast (*de Hemptinne, op. cit.*, p. 372). Prior to the arrival of the Bayeke, the native blacksmiths, according to Ladame (Congo 11: 2, 1921, p. 691), were unacquainted with the art of drawing copper wire. Before that time they probably had no knowledge whatever of any kind of wire-drawing.

The draw-plate of the Bayeke (*dikombe*) is cone-shaped, and has only one hole. "The pincers" (*munganga*, the same word as used among the Wanyamwezi and the Bafulero) consist of two pieces of iron, 25 cm. long and 2 cm. wide. They are strongly clamped together by means of two spiral rings, tightened on to them by blows from a hammer. For thicker wire a lever is used (Fig. 3). For the rest, as regards the working process the reader is referred to the above-mentioned articles by Mahieu and de Hemptinne.

I am informed by Professor Maes that in 1936 the Tervueren Museum added to its collections a complete outfit for the working of copper from the Bayeke (Katanga), including two iron draw-plates and three "pincers", together with a series of photographs illustrating wire-drawing.

The Vachokwe (Kioko) of Angola also draw wire, which Schachtzabel — so far as I know — was the first to mention. In former times they produced their wire exclusively from native iron, but nowadays prefer European-imported wire of brass, or copper wire obtained — via Lunda — from Katanga. Today it is therefore only a question of "improved raw material" which by heating is rendered ductile and then "drawn through a quadrilateral iron bar (*tjingangula*) provided with holes of diminishing sizes until the wire is thin enough for winding round rifle-stocks, knife-handles and "swagger" sticks, in the manner affected by the Tjiwokwe."³² Baumann depicts a flat draw-plate and a clip (*lumana wa tschingangula*). The former consists of a narrow piece of wrought iron with nine holes of different sizes, and the latter of a bifurcated iron bar with a ring clamped round it. According to B., it is not always the blacksmiths that draw wire, but

this work is often carried out by some specially trained artisan.³³ In the village of Mwalilu this individual was also a teacher of the art of stilt-walking.

According to Hambly, the Ovimbundu "do not draw iron wire, although they know of the process which is practised by the Vachokwe".³⁴

From the Bakuba I have a solitary statement, provided by Wolff who words it in such a manner that it must be taken to mean that wire-drawing is practised among that tribe: "Das Kupfer wird im Süden des Lundareiches gewonnen und kommt durch den Zwischenhandel gewöhnlich in der Form eines Andreaskreuzes, seltener in Stangen, hierher auch werden aus dem Kupfer feine Drähte gezogen, mit dem sie die Griffe Ihrer Dolchmesser und ihre Speerschäfte umwickeln".³⁵

As to conditions prevailing among the Baluba I am without information. As already mentioned, Maes shows a photograph of a wire-drawing Baluba man, but it was taken at Moliro on Lake Tanganyika and therefore cannot be taken as evidence of wire-drawing existing among the Baluba. That tribe is however so highly cultured, and such near neighbours of Katanga, that it would be strange if they did not know the art in question. Nevertheless I do not feel myself justified in placing them on the map of the geographical distribution of wire-drawing in Afrika (fig. 1). Colle makes no mention of this handicraft in his monograph (Les Baluba, Bruxelles 1913).

Not having succeeded in obtaining any further data regarding the Congo I will now turn back to the regions west of Lake Nyasa, and thence proceed southwards.

Of "Moamba's village", about half-way between Tanganyika and Bangweolo, Livingstone says: "A great deal of copper wire is here made, the wire-drawers using for one part of the process a seven-inch cable. They make very fine wire, and it is used chiefly as leglets and anklets; the chief's wives being laden with them, and obliged to walk in a stately style from the weight; the copper comes from Katanga".³⁶ From this description it is not very clear which tribe is referred to, though possibly the Babemba are alluded to. To me, it is also obscure what Livingstone means by "a seven-inch cable".

From Kapesha's village, three days' march north of Lake Bang-

weolo, wire-drawing is mentioned in the account of the home-bringing of Livingstone's body: "They saw a large quantity of iron and copper wire being made here by a party of Wanyamwezi. The process is as follows: a heavy piece of iron, with a funnelshaped hole in it, is firmly fixed in the fork of a tree. A fine rod is then thrust into it, and a line attached to the first few inches which can be coaxed through. A number of men haul on this line, singing and dancing in tune, and thus it is drawn through the first drill; it is subsequently passed through others to render it still finer, and excellent wire is the result".³⁷

Gouldsbury and Sheane state in a general way that the tribes of Nyasaland and N. Rhodesia, e. g. the Shinga (Basenga), southeast of Bangweolo, draw wire from brass or copper.³⁸ The latter metal comes from Katanga. Johnston gives a description of wire-drawing — mostly brass wire: "a plate of iron which is pierced with a number of holes of graduated sizes" — from Nyasaland in general. Especially fine work is done on the lower Shire and the Zambesi.³⁹ Stannus mentions the method — "an iron plate with an aperture" — in his treatise on the inhabitants at the south end of Lake Nyasa, more especially those near Fort Johnston.⁴⁰

Schurtz relates, after Guyot, how on the lower Zambesi, particularly in the neighbourhood of Tete, very fine brass wire is drawn by means of an iron plate, and used for ornamenting axe-handles, spears and arrows, and knife-sheaths. This handicraft, which requires great skill and is very remunerative, is generally carried on by old men.⁴¹ Here, Guyot adds, are also found goldsmiths who have immigrated from the Sena district. "Man liefert ihnen das Gold in ungerinigten Zustande (en matrical); sie reinigen es, schmelzen es, hämmern es, dann ziehen sie es in äusserst feine Drähte, aus denen sie Ketten und Ohrringe fertigen; letztere macht man auch aus Silber. Der Arbeitsbrauch ist folgender: der Goldschmied giebt das ihm anvertraute Gold in verarbeiteter Form zurück und man bezahlt ihm seine Thätigkeit, die wenig kostet, besonders".⁴¹ This is the only instance I have been able to obtain of East African negroes working in gold and silver. Foreign influence may therefore well be presumed. The early Portuguese missionaries of those parts taught the natives how to work in precious metals, especially gold. In addition, the

Portuguese imported Indians or Eurasians into their East African colony.

Again, it appears that wire is, or at any rate formerly was, drawn by certain Barotse south of Katanga. As to this, Moffat relates how among the Barolong, a western Bechuana tribe, he met a Barotse man from the "Kurrechane mountain" — thus a stranger among the Barolong — who worked in copper and brass, and among other things drew wire through a flat draw-plate with a number of holes of different sizes.⁴² Moffat writes: "He must show me the whole process of melting copper, making brass and drawing wire. — A round, smooth stick, about 3 feet high, having a split in the top, was fixed upright in the ground . . . He opened the split in the upright stick, to hold fast the end of the wire, when he forced the plate and wire round the stick with a lever-power, frequently rubbing the wire with oil or fat. The wire is, of course, far inferior in colour and quality to our own brass-wire". M. adds in a footnote that specimens of the wire, a hammer, and a draw-plate, may be seen in the Missionary Museum, Mission House, Bloomfield Street, Finsbury. Holub speaks of "iron wire of local manufacture" in the northeastern part of the Barotse area, which may perhaps be supposed to imply that iron wire was drawn there. Copper variety on the other hand, was imported.⁴³

Hall's list of objects discovered in the Elliptical Building of the Zimbabwe ruin includes, according to Caton-Thompson, an iron wire-drawer.⁴⁴ Among the ruins have moreover been made a number of finds of wire of gold, bronze and brass. This type of wire, which from all evidence appears to have been produced by drawing, has also been found at Mapungubwe, the sandstone hill on the south bank of the Limpopo river (which forms the northern boundary of the Transvaal) in the northern Zoutpansberg district.⁴⁵ No doubt a great deal of such wire still remains hidden in the archaeological sites of S. Rhodesia and northern Transvaal.

From the Bavenda of the Zoutpansberg district in the northern Transvaal, Stayt describes the drawing of copper wire. The iron draw-plate (*magoka*) depicted by him is elongated and narrow, and provided with 8 holes of different sizes. The pincers (*mabako*) are of the type already familiar to us, the two ends being held together by an iron ring (*tshongolo*) and an iron wedge to hold the piece of

wire. The pincers are wedged firmly into the fork of a tree or into a slot cut for it. A forked stick is used as a lever and placed against the draw-plate between it and the pincers. With this stick the draw-plate is levered around the tree, drawing out the wire and winding it around the tree. When very fine wire is being drawn, the draw-plate may be held on the ground by the workman's two feet while he draws the wire through the required hole, rolling it straight on to a stick with his hands.⁴⁶

In the northern Transvaal, chiefly among the Bavenda but also near Belingwe in Southern Rhodesia, live the Balemba (Malepa), from whom the Bavenda probably learnt the art of drawing wire. The former are, according to Schlömann and Junod, expert copper-smiths and draw wire. Copper was formerly imported in the form of bars, according to their own statement from Zimbabwe. "In trading purpose the men drew copper wire for bracelets, which were so highly valued among the Bavenda at one time, that only members of the royal family were allowed to purchase them. Since the advent of the Europeans this art has died out, as machine-made copper wire can be bought very cheaply in all the native trading stores."⁴⁷

In the time of Schlömann this industry was however in full swing: "Nowadays, i. e. in the early 1890's, the Malepa largely work up European-imported brass and copper wire. In every Malepa village is set up a thick wooden post, the height of a man, which is used in wire-drawing. Four feet above the ground a conical hole has been bored, or burnt, through the post, with one opening about the size of a thaler while the other is considerably narrower. Into the larger opening is wedged fast the so-called draw-iron, consisting of a steel plate pierced with a hole."⁴⁸ Of such draw-plates the Malepa keep a whole series with progressively diminishing holes through which the metal bar is drawn by two or three workers until the thickness of the wire has been reduced to the fineness required. By means of the draw-plate the wire is at the same time given the desired shape, round or fashioned, according to its special purpose. The wire produced by this method is then worked into a wide variety of objects, chiefly necklets, armlets, rings for wearing round the legs, etc. These rings frequently contain a core of hair from domestic cattle, zebra, or horse, round which the fine copper or brass wire is spirally wound".⁴⁹

According to Junod, the Balemba call their draw-plate *magogo* (almost the same word as among the Bawemba), and the pincers *ngwenya*, 'crocodile'.⁵⁰ Their wire-drawing appliances greatly impressed the Basuto, J. says, as they had never before seen anything of that kind. Even that early writer, Mauch, while only devoting a few lines to the Balemba, points out how they differed in many respects from their neighbours, the Basuto and the Matabele. Among other things he says: "They are the only ones possessing the knowledge of drawing wire".⁵¹

From the Baronga, living round Delagoa Bay, Junod has made the following note. He appears to be somewhat reserved about it, but it is probably correct: "Je crois avoir entendu dire que certains forgerons fabriquent eux-mêmes le fil de métal [iron wire wound round the upper end of spear-handles] qui est aussi employé pour la confection des bracelets (*bousenga*). Mais généralement les natifs l'achètent à Lourenço Marques ou dans les magasins des Banyans".⁵²

Formerly, at all events, the Zulus, too, drew wire. From the 1870's Krantz describes how the Zulu blacksmith melted copper, produced brass and drew it into wire. The brass ingots that had been moulded in a heap of sand were hammered, while now and again being softened by reheating in the fire, until thinned to a diameter of about 3 mm. Then one end of the bar was pointed against a stone, and made thinner and thinner by being drawn through "that appliance which is also known in Europe, the iron draw-plate, until the brass wire was about as thick as stout saddler's thread".⁵³ Cline (p. 111) refers to an early statement regarding wire-drawing in Natal, i. e. presumably among the Zulu.⁵⁴

In later works on the Kaffir group I have not been able to find any reference to wire-drawing, from which it may well be inferred that the industry in question no longer survives among those peoples. To them, as we know, trade wire has long been obtainable.

Reverting now to the Congo, and thence proceeding northwards in West Africa, I have come upon no reference to wire-drawing until reaching Nigeria. It is true that Cline (p. 110) states that the Bafia of Cameroon "draw wire from Hausa tin straws by passing them through holes in a piece of buffalo horn", but he must have misunderstood his authority, Tessmann, according to whom the piece

of buffalo horn was used for quite a different purpose.⁵⁵ In Nigeria, on the other hand, silver wire is drawn by Hausa craftsmen, and Meek describes the process from the town of Bauchi. There they use a piece of iron in which "series of graded holes are pierced, the largest being about one-eighth of an inch in diameter, and the smallest having a diameter about the size of a thin pin. The round strip of silver is smeared with grease, and the holes in the iron bar are also greased. The edge of the silver strip is filed to fit the largest hole. The worker holds the iron bar against the soles of his feet, and with a pair of nippers pulls the strip of silver through the hole, thereby drawing out the silver into a wire one-eighth of an inch thick. The process is continuously repeated each time through a smaller hole, until finally, after two hours' work, from a five-franc piece he has made eighteen yards of delicate silver wire. Chain necklets and other ornaments are made from this wire, which is cleaned by being heated and dipped in the juice of tamarind pods mixed with salt".⁵⁶

It may well be supposed that the Hausa, who are so widely distributed in Nigeria as well as outside its borders, also draw wire in many other places. Stuhlmann does in fact refer to wire being drawn among the Hausa, generally speaking, but does not mention his source (*Handwerk und Industrie*, p. 61). That well-known authority on the Hausa, the late P. Staudinger, of Berlin, whom some ten years ago I wrote concerning this question, told me that for his part he never saw any wire-drawing among that people, but was not prepared to deny its existence. Stuhlmann (*op. cit.*, p. 61) also refers to wire-drawing in Togo, but does not particularize. Porto Seguro is however known for its skilled goldsmiths (*Dahse, Zeitschrift f. Ethn.*, p. 13, 1911).

Turning to the Gold Coast, we find early European travellers mentioning the goldsmith's art, ornaments of gold and silver, filigree, chains, etc. Especially famous for their goldsmiths are Accra, Cape Coast and, in earlier times, also Elmina. According to Barbot (*A description of the coasts of Nigritia, etc.* Churchill's Collection, London 1732, V. pp. 157, 262), the natives learnt this kind of work from the Portuguese and the Dutch, but subsequently they perfected their skill themselves. It is, however, probable that even before the arrival of the Europeans the natives on this coast were workers in

gold. As regards wire-drawing I have, however, been unable to find any reference either in earlier writers or later, with the possible exception of Foà, whose statement regarding the natives of Accra probably have some bearing on wire-drawing: "Les Accraens sont des orfèvres très habiles . . . Ils travaillent l'or et l'argent à la filière et obtiennent des fils de la finesse d'un cheveux; le filet est fait par eux à la main avec une régularité mécanique".⁵⁷

To get an idea of conditions on the Gold Coast I have written to Mr. H. V. Meyerowitz, of Achimota College, the Gold Coast, who has very kindly supplied me with the following information regarding wire-drawing and gold work in general on the Gold Coast (letter dated 7.9.1938): "With regard to your question about wire drawing in the Gold Coast, the goldsmiths in Accra and Ashanti do three types of work, the one is the covering of carved wooden ceremonial objects with a thickish gold leaf (umbrella tops, staffs, all kind of 'stool property'), the second type is the casting of heavy gold ornaments mostly out of 8 carat gold, like bangles, charms, rings, hair pins etc. These two occupations are traditional and definitely ~~Ar~~ imitation of Indian filigree, introduced by I do not know whom. Pretty uninteresting stuff for which of course much thin wire is needed. This wire silver or gold is drawn through European imported steel draw plates with holes of different sizes and shapes. In connection with this it may interest you to hear that daily the most beautiful specimens of gold workmanship are smashed up and are sent to the banks in England without the trace of any record."

At Timbuktu and in the surrounding region wire is drawn by means of a draw-plate (*biti*) of iron, pointed at both ends and having many holes of varying sizes.⁵⁸ It appears that only gold and silver wire for filigree is produced.

Park has a statement which most likely refers to the town of Kamalia (w. of Bamako) and the Mandingo of that place, and also to the countries of Bambara and Kaarta: "The blacksmiths likewise draw gold into wire and form it into a variety of ornaments".⁵⁹

From Morocco I have not succeeded in finding any reference at all to wire-drawing among the more primitive rustic population, and for the rest only a single, and early one, from Fez in which, in connection with the fabrics locally manufactured, it is stated that these "are intermixed with a beautiful gold-thread, much superior to any

~~Ar~~ African. But the third type of work is definitely

that is manufactured in Europe, insomuch, that the gold-thread imported from Leghorn [Livorno] and Marseilles is used only in such *hazams* [silk sashes] as are made for exportation to Sudan, Draha, or Bled-el-Yereed, but those made for the great and opulent for home consumption, are manufactured with the gold-thread of the Fas' [Fez] manufacture. Whether these expert artificers learned the mystery of gold beating, and gold-wire drawing, by which they obtain gold-thread, from the Egyptians, I am not competent to say, but *they* say they derived it in ancient times from the Arabs, as well as the art of cutting, polishing and setting precious stones."⁶⁰ . . . "The manufactures at Morocco and Terodant are similar to those of Fas, with the exception of that of gold-thread, and the cutting and polishing of precious stones" (p. 217).

To the above early account may be added that, according to Eudel, the art of wire-drawing is much practised in Morocco in making embroideries for garments.⁶¹ The most important centres for the manufacture of gold and silver ornaments are Tanger, Mogador, Marrakesh, Mequines, Tetuan and Rabat. In Mogador all jewellers are Jews, Eudel says, and this probably holds good in the case of many other towns.

In Algiers, and presumably also in other Algerian towns, the jewellers and goldsmiths nowadays generally use a draw-bench, but formerly wire (gold, silver) was drawn by hand, and this simple method is still surviving in parts. A metal disc with holes of varying diameter was held in position against the sole of the foot, and the wire was drawn by means of a rope (*Eudel, op. cit.*, p. 185). In Algeria, Eudel says, the Jews practically monopolized the gold-working industry.

In other North African towns, i. e. in Tunisia, Libya and Egypt, the same conditions no doubt prevailed. I have no literature to which I am able to refer, but Mr. Arthur E. Robinson has very kindly supplied me with information on this matter (letter of 27.4.1938). He writes: "With regard to wire-drawing I am not an expert but have seen the process in practice in Tunis, Tripoli, Alexandria, Cairo, Khartoum, various exhibitions of native crafts and lastly filmed. In each case the method seemed to be the same. The metal sheet was cut into strips. One end was gently beaten or pulled (if a soft metal) to a point. This was passed through an iron or hard brass plate in

which holes of varying sizes had been pierced. The pointed strip was then pulled sharply by hand *by one movement* and the wire was drawn through. If a very fine wire was necessary, the wire was drawn through two or more holes until the desired thickness was obtained. — The film I saw was one of Trinidad and the wire-drawer was an Indian coolie jeweller from Calcutta, who had emigrated to Demerara and later joined his compatriots in a settlement they had formed on the island of Trinidad."

The only authenticated instance from northern Africa outside of towns, and of true ethnographic character, that I am in possession of, relates to the Shawiya, a Berber tribe inhabiting the Aurès mountain district of Algeria, a land of survivals. From them Hilton-Simpson describes chain-making, how "the bar of silver has to be beaten with a hammer until it assumes the proportion of coarse wire, then drawn through a series of holes, decreasing in size, in a steel plate, until this wire becomes sufficiently fine, and, at last, it is beaten flat . . ." ⁶²

3. SUMMARY AND CONCLUSIONS

Occurrence outside Africa.

If we now, since I have presented the material, take a look at the *form* of the appliances used in wire-drawing, we find the flat — and usually rather narrow — many-holed draw-plate spread over almost the entire area of distribution, while the conical variety with usually a single hole appears confined to certain parts of Tanganyika Territory (the great Lake region) and to the Bayeke of Katanga. This circumstance, however, hardly seems to justify any conclusions as regards interrelation of the two types, especially as they occasionally occur side by side. For example, the conical type is used among the Konde and other peoples on the plateau between Lakes Tanganyika and Nyasa, while the flat, multi-holed draw-plate occurs in Ukinga, directly east of it. — It would be interesting to know in what other places than Abyssinia the wooden draw-plate of shuttle-shape occurs.

Wire, as we know, is generally drawn by hand, but a *lever* is used by Bayeke and Bavenda, perhaps also by certain Wanyamwezi and Barotse (according to Moffat), and possibly also elsewhere. From

this distribution I am however not prepared to draw any inferences. Such a technical improvement may, it seems to me, quite well have come into being as a local invention and, among other things, be due to the character of the wire, its thickness, etc.

In all cases where authentic information has been obtainable I have noted down the *native names* of the appliances, but they cannot be said to offer anything of particular interest. Among other things, because the material is too limited. It may, however, be pointed out that the Kamba, and Kikuyu word (*uta*) for draw-plate is apparently practically identical with the *buta* of the Bafulero on the north end of Lake Tanganyika. The Wanyamwezi and the Bayeke employ exactly the same words for draw-plate and pincers, respectively (*ikombe*, *digombe*, and *muganga*). But it may be noted that the Bayeke have immigrated into Katanga from regions east of Tanganyika. It may be regarded as practically certain that into Belgian Congo and Angola the art of wire-drawing was introduced from the east, and possibly also from the southeast.

In the present essay my principal aim has been that of giving as complete a picture as possible of the distribution of wire-drawing in Africa. But the question naturally arises as to whence that art came into the continent, in particular Negro Africa. For it must be regarded as quite certain that there it is not autochthonous. Stuhlmann, who — it must be admitted — founded his opinion upon rather slender material, supposes (*op. cit.*, p. 60) that the art of wire-drawing "originates from a common centre which may well be supposed to have lain in northeastern Africa, or in Asia". As regards northeastern Africa he, for his own part, has no information at all. H. Baumann, writing in 1929, says that while the East African metal industry cannot be said to be undeveloped, it has nevertheless not attained any really high development outside the area where Arabian-Persian-Indian influence has held sway. It is a moot question, he further says, whether wire-drawing be ascribable to the earlier East African or the Hamitic culture. The preponderantly greater importance of iron, brass, and copper wire among the Hamites (in particular the Masai) lends greater probability to the latter alternative, he says, and in conclusion points out how wire-drawing, like many other culture elements, was imported into Angola from East Africa.

For my part, in my essay of 1926 (*op. cit.*, pp. 104 sq.) I tried,

among other things, to show that in Negro Africa wire-drawing occurs among peoples influenced by non-Negro cultures. Other peoples, dwellers in regions bordering on the distribution area of the technique, may at most have adopted the art of wire-drawing by direct borrowing. This I attempted to illustrate by instances especially designed to show how, in East Africa, many wire-drawing peoples are, in some way or other, Hamite-influenced. Its origin I was inclined to place in ancient Egypt (the ancient Egyptian civilization contained many culture elements possessed in common with other Hamitic peoples), and as another possible point of ingress I considered the river Zambesi up which probably not a few culture elements appear to have made their way into the interior. Even the Zimbabwe culture may well be supposed to have played a certain part as a centre for the dissemination of wire-drawing as well as metal-working technique. Having however subsequently learnt, among other things, that wire-drawing occurs in Abyssinia, I now no longer look upon ancient Egypt as a possible cradle — what statements we have concerning it besides appear to me, with all due deference to Vernier, still rather inconclusive — but am of opinion that, at any rate as far as East Africa is concerned, we should turn towards southern Arabia or India. As regards western Sudan it may well be supposed that the art was imported from Morocco. Towards the close of the Middle Ages frequent intercourse by way of the Sahara prevailed between Morocco and western Sudan, and Moroccan Sultans ruled over parts of western Sudan. With regard to Arabia and India, the distributional area of wire-drawing in East Africa coincides fairly well what we already know of Arabo-Indian influence in those parts.

Now it must however be admitted that my data as regards wire-drawing in Arabia and by Arabs are unfortunately, somewhat weak. From the pre-Islamic cultures, particularly in southern Arabia, I am in possession of no data, and that experienced connoisseur of ancient as well as modern South Arabia, Professor Viktor Christian, of Vienna, has told me that from there he has no information. Mr. W. H. Ingrams, First Political Officer to the Hadhramaut, was kind enough to reply to my query (through Mrs. D. Ingrams, as he himself was starting on an expedition to the interior): "We will both do our best to answer your question, though at present we have no information on "wire-drawing" but I rather think the general practice

is to hammer out the wire; however we will make further enquiries." (Letter of 11.11. 1937). Also from Miss G. Caton-Thompson I am in receipt of a negative answer: "While in S.W. Arabia I did not see any metal wire-drawing. But in the towns and villages we visited practically no crafts were pursued" (letter of 18.12.1938). On the other hand it is quite categorically stated by Eudel that "the Arabs" possess draw-plates of steel (*op. cit.*, p. 85); unfortunately he gives no authority for this statement. Again, Cline has himself "seen Arabs in Makalla, on the south Arabian coast, drawing iron wire by the rotating beam method, such as is used by the Masai and the Banyamwezi" (Cline *op. cit.*, p. 112). Makalla is Mr. Ingrams' residential town, but for all that there is no reason for doubting C's statement.

From India, my data are scanty, but that wire-drawing is there widely pursued is beyond all doubt. In the foregoing has been mentioned how Mr. A. E. Robinson in a film saw an Indian coolie jeweller from Calcutta draw wire. It is true that Trinidad was the scene of his operations, but he had no doubt learnt the art in his native country, India. To Mr. James Hornell I am indebted for the following information, with accompanying sketch (in a letter to Dr. S. Lagercrantz, dated 23.5. 1938): "I have been visiting the India Museum, London, and find that they have a wire-drawing plate in iron (or steel) ca 8 inches by 1 inch. It has three rows of holes lengthwise, those in centre largest. Each hole is bevelled".

From "Report on the administration of the Punjab and its dependencies for 1882—83" (Lahore 1887) I cite the following: "Gold-wire-drawing and tinsel-making in all its stages is practised chiefly at Delhi and Lahore. The census shows 1,253 persons engaged in these processes. It is remarkable that though Lahore is a known centre of *kandlakashi* (ingot-making and gilding) and *tárkashi* (wire-drawing), the census table is blank for the city. Possibly the workmen have been included in the 644 persons shown as dealers or makers of gold-thread" (p. 174). And further: "In many trades there is no doubt that the same workman will complete the article in hand, from the first shaping of the raw material down to the last finish of engraving or other ornamentation. But in some trades we have distinct branches. In the gold wire-drawing trade the workman who makes the 'kandla' or gilt ingot, the 'tárkash' or wire-drawer, the 'dabkai', the man who flattens the fine wire, and the workman who twists the

flattened wire on to red or white silk to make gold or silver thread, are all separate craftsmen" (p. 164). I have not "Census of India" available, but think it likely that a search through its pages would yield some information.

Authenticated instances might also be adduced from the Indo-Chinese peninsula, at any rate as regards drawing of silver or gold wire. Here I confine myself to mentioning what Dr. K. G. Izikowitz (lately returned from an ethnographical research expedition into French Indo-China) has been kind enough to tell me concerning the Lu, a tribe belonging to the Thai group. In the Lu village of Tafa (Prov. of Haut-Mékong, Laos) he observed a draw-plate for the manufacture of silver wire, consisting of a square iron plate pierced with a number of holes of varying sizes. The drawing was made by hand, with the aid of pincers. The silver wire was first tapered at the end by hammering, so that it could be passed through one of the holes.

From China, Hommel⁶³ gives a detailed description of the drawing of wire in gold, silver, copper and bronze in the town of Chang-shu and surrounding district, in the province of Kiangsi. The drawing is performed in more elaborate style with a machine (Hommel, fig. 38), but also, without any such aid, by hand (fig. 37).

Hommel (p. 27) makes regarding the Chinese the statement — in itself rather surprising, considering their otherwise highly developed culture — that they never succeeded in drawing iron wire, and the reason for this he gives as follows: "The iron to start with has to be highly annealed, and this has to be repeated after every two or three reductions. The Chinese do not know this, hence their inability to draw iron wire. Their only attainment in manipulating iron wire is to reduce foreign iron wire by drawing it once or twice through their draw plates."

At to whether this assertion of Hommel's is in accordance with facts is a question I have hardly any reason for entering upon in the present treatise, but I wish, however, to point out that v. Richthofen refers to the drawing of iron wire in Shansi.⁶⁴ He describes, for example, the village of Nan-tsun (p. 412) as "a place famous for its cast-iron products, possessing hundreds of workshops for a variety of iron industries, such as foundries, puddling furnaces, nail-forging, wire-drawing, etc." Von R. (p. 408) on one occasion met a large

number of mules and coolies loaded with iron products of various kinds, including wire. And further on (p. 413) he says: "Es giebt auch eine grosse Zahl von Werkstätten für die weitere Verarbeitung des Eisens. Insbesondere werden Draht und Nägel gemacht. Dies geschieht meist in kleinstem Masstab in den Häusern der Dorfbewohner". That iron industry must be very anciently established in Nan-tsun is the opinion of Richthofen, who also adduces reasons for that belief.

From the Chahar Mongols of Inner Mongolia Dr. G. Montell, leader of the ethnographical section of Sven Hedin's latest great expedition, has to our Museum added a complete set of a Mongolian silversmith's tools, including draw-plates for silver wire (fig. 4). They are of the same type as those described and depicted by Hommel, from Kiangsi.

If we further give a cursory glance at Europe, we do not seem able to gather much in the way of information as to early wire-drawing. Various authors have asserted — while occasionally only appearing to cite others — that true wire (produced by drawing) was manufactured even in very ancient times, cf. archaeological finds from Mykene, Hissarlik (Troy), and, later, from Greeks and Romans.⁶⁵ But this has equally often been denied by others who maintain that in ancient times wire-drawing in those regions has never yet with certainty been proved to have existed. As regards our present knowledge on this point I refer to Feldhaus,⁶⁶ Roeder (article "Draht" in Ebert's *Reallexikon*)⁶⁷ and Hommel (*op. cit.*, p. 26). Feldhaus writes: "Aus dem Altertum haben wir auch keine Beschreibung des Drahtziehens, nur solche des Schmiedens . . . Fraglich bleibt, wie man den Draht zu dem römischen Drahtzeil (s. d.) herstellte". All three of these authors mention how the monk Theophilus⁶⁸ (ca. A.D.1100) refers to draw-plates for making wire as something well known. A still earlier instance is given by Hommel: "Of interest for our investigations (inasmuch as it points to the Orient) is a statement of Muratori in his *Antiquit. Italiae*, Tom. II, p. 374, which gives an account of an old manuscript of the 9th century, kept in the library of the cathedral chapter at Lucca. It refers to the drawing of gold wire, an art which probably reached Italy from the Orient, and thence was introduced into France." Forged and hammered wire was also manufactured

at a later date. Feldhaus (*op. cit.*, p. 201, with bibliographical references) points out that wire-drawing occurred in Nuremberg and Augsburg in the early part of the 15th century, and, according to Hommel, "since the middle of the 14th century the wire-makers of Nuremberg are no longer referred to as wire-smiths, as heretofore, but are given the name of wire-drawers."

Whether the above data be accurate or no, it is however beyond all doubt that the art of wire-drawing is of considerable antiquity in Europe. We have, for example, proof of its existence in Scandinavia, in the Viking Age. Roeder, although he does not give his authority, states that draw-plates dating from that era have been archaeologically recovered. In 1926 Prof. T. J. Arne kindly informed me that a pierced draw-plate had been found in a Norwegian viking grave, and another still earlier in a pre-historic bog deposit in Denmark. In the National History Museum at Stockholm (Statens Historiska Museum) there is further, as I am told by Dr. H. Arbman, a large smithery find from Gotland (Slite) and dating from the Viking era (probably the 10th century A. D.), which among other things includes the two iron objects seen in fig. 5. Of these, at any rate the top one must undoubtedly be looked upon as a draw-plate.

From the northern peoples the Lapps probably borrowed their wire-drawing, in which, as we know, they use a draw-plate made of bone.⁶⁹

If we lastly return for a moment to Africa we are unable, from the material here adduced, to form an idea as to the age of wire-drawing in that continent, but neither do we know how old it may be in Europe or Asia, and possibly that question will never be cleared up. There is nothing, it appears, to indicate that wire-drawing came to northern Africa from classical antiquity, from ancient Rome or Greece. The probability is that Africa received the art from Arabia or India. Particularly as regards the former, further confirmation is however needed in addition to the data I have been able to adduce in the present essay.

NOTES

¹ K. G. Lindblom, *Dragning av metalltråd i Afrika*, Rig, p. 97—109 (7 fig.). Stockholm 1926.

² W. Cline, *Mining and metallurgy in Negro Africa*, p. 109—113. Menasha 1937.

³ E. Vernier, *L'etirage des fils* (Polemics against Flinders Petrie). Bull. de l'Institut Français d'Archéologie Orientale, p. 40, T.XII. Le Caire 1916.

⁴ G. Möller, *Die Metallkunst der alten Ägypter*, p. 30. Berlin 1924. See also "Draht" in Eberts Reallexikon d. Vorgeschichte. Berlin 1925.

⁵ For the earliest finds of ironwork in Egypt, see Möller, *op. cit.*, p. 12.

⁶ A. Wilkinson, *Manners and customs of the ancient Egyptians*, III, p. 129. London 1837.

⁷ A. Ermann u. H. Ranke, *Ägypten und ägyptisches Leben im Altertum*. Tübingen 1923.

⁸ E. F. Rohrer, *Beitr. z. Kenntnis d. Materiellen Kultur d. Amhara*, p. 107. Bern 1932.

⁹ Rohrer refers to the cone-shaped draw-plate from Bukoba depicted by F. Stuhlmann in *Handwerk u. Industrie in Ostafrika*, p. 60. Hamburg 1910.

¹⁰ F. J. Bieber, *Kaffa*, I, p. 412, fig. 198. Münster 1920.

¹¹ M. Th. v. Heuglin, *Reise nach Abessinien*, p. 249. Jena 1868. Regarding Armenians I am informed by Dr. A. Westholm, of the Swedish archaeological expedition to Cyprus, that drawing of gold wire is pursued in Nicosia, with an elongated narrow draw-plate, and that the wire-drawers for the most part are Armenians.

¹² Emin Pascha, *Die Tagebücher*. Hersg. von F. Stuhlmann, I, p. 277. Hamburg 1917. S. Lagercrantz has turned my attention to this reference.

¹³ C. New, *Life, wanderings, and labours in East Africa*, p. 115 ("drawing wire, making small iron chains"). London 1873.

¹⁴ H. S. Routledge, *The Akikuyu of British East Africa*, p. 92. London 1910 (with splendid photographs of the tools).

¹⁵ G. Lindblom, *The Akamba of British East Africa*, p. 530, figs. 158—161. Uppsala 1918—20.

¹⁶ O. Kersten, Baron C. C. von der Decken's *Reisen in Ost-Afrika*, II, p. 20. Leipzig 1871. Cf. also R. Andrieu, *Die Metalle bei den Naturvölkern*, p. 22. Leipzig 1884.

¹⁷ M. Merker, *Die Masai*, p. 116, fig. 26 a, b. Berlin 1910.

¹⁸ M. Weiss, *Die Völkerstämme im Norden Deutsch Ostafrikas* p. 417 sq., figs. 327—328. Berlin 1910.

¹⁹ Richter, *Aus dem Deutsch-Ostafrikanischen Schutzgebiete*. Mitteil. aus d. Deutsch. Schutzgebieten, XII, p. 123. Berlin 1900. Description of wire-drawing in

Bukoba and Kiziba is also given by *F. Stuhlmann*, Mit Emin Pascha ins Herz von Afrika, p. 717 (2 figs., conical draw-plate), Berlin 1894, *Stuhlmann*, Handwerk und Industrie, p. 60, and by *H. Rehse*, Kiziba, Land und Leute, p. 87, fig. 117. Stuttgart 1910.

²⁰ *Stuhlmann*, *op. cit.*, pp. 117, 679. *P. Kollmann*, The Victoria Nyanza, p. 114, fig. 151. London 1899. *H. Schurz*, Das afrikanische Gewerbe, p. 47. Leipzig 1900.

²¹ *H. Meyer*, Die Barundi, p. 85. Leipzig 1916.

²² *Cline*, p. 109, after *F. M. v. d. Burgt*, Un grand peuple de l'Afrique Equatoriale, p. 51. Bois-le-Duc 1903.

²³ *R. Stern*, in *Stuhlmann*, Handwerk u. Industrie, p. 158.

²⁴ See also *F. Ladame*, Le droit des indigènes sur les mines de cuivre du Katanga. Congo, p. 691, note. Bruxelles 1921.

²⁵ *Stuhlmann*, *op. cit.*, p. 157. *W. Blohm* (Die Nyamwezi, Hamburg 1931, p. 164) only makes cursory mention of the drawing of iron and copper wire, and for other particulars refers to Stern.

²⁶ According to Richter (*vide supra*), the forked post employed in securing the draw-plate is in Bukoba known as *ikombe*.

²⁷ *J. H. Speke*, Upptäckten av Nilens källor, pl. 11. Stockholm 1865.

²⁸ Evidence of a negative character is supplied by Reche regarding the Nyaturu and Issansu. "Their blacksmiths do not know how to draw wire" (Zur Ethnographie d. abflusslos. Gebietes Deutsch-Ostafrikas, pp. 58, 84. Hamburg 1914).

²⁹ *F. Fülleborn*, Das Deutsche Nyassa- und Ruwuma-Gebiet, p. 173 (with ill.), Atlas Tb. 37: 6—8. A photograph (Tb. 88a) shows four men occupied in drawing wire. The draw-plate is in the usual way fixed at right angles between two posts, and held in position by one man.

³⁰ Journal de route de la Mission scientifique du Katanga. Mentioned by *Mahieu*, *op. cit.*, p. 125, note.

³¹ *J. Maes et O. Boone*, Les peuplades du Congo Belge. Bruxelles 1935.

³² *A. Schachtzabel*, Im Hochland von Angola, p. 143. Dresden 1923.

³³ *H. Baumann*, Lunda, p. 83, fig. 45. Berlin 1935.

³⁴ *W. D. Hambly*, The Ovimbundu of Angola, p. 158. Chicago 1934.

³⁵ Wolff's Bericht über seine Reise in das Land der Bakuba. In *H. Wissmann* etc., Im Inneren Afrikas, p. 251. Leipzig 1888.

³⁶ The last Journals of D. Livingstone, I, p. 198. London 1874.

³⁷ *op. cit.*, p. 331. London 1874.

³⁸ *C. Gouldsbury and H. Sheane*, The great plateau of N. Rhodesia, p. 280. London 1911.

³⁹ *H. Johnston*, British Central Africa, p. 463. London 1897.

⁴⁰ *H. S. Stannus*, Notes on some tribes of British Central Africa, Journ. Anthr. Inst. 1910, p. 331.

⁴¹ *H. Schurtz*, Das afrikanische Gewerbe, p. 60. After Guyot in Bull. Soc. Géogr. de l'Est 1884, p. 609 sq. (This work is not accessible to me).

⁴² *R. Moffat*, Missionary labours and scenes in South Africa, p. 468. London 1842. Vide also *I. G. Wood*, The natural History of Man, Africa, p. 100. London 1874.

⁴³ *E. Holub*, Sieben Jahre in Südafrika, II, p. 382. Wien 1881.

⁴⁴ *G. Caton-Thompson*, The Zimbabwe culture, pp. 91, 57, 82, 83, 111. Oxford 1931. As regards iron wire-drawing C.-T. refers to *Hall*, Great Zimbabwe (London 1905). I am, however, unable to find any such reference in that work.

⁴⁵ *L. Fouché*, Mapungubwe, ancient Bantu civilization on the Limpopo, p. 117. Cambridge 1937.

⁴⁶ *H. A. Stayt*, The Bavenda, p. 65. Oxford 1931.

⁴⁷ *Stayt*, Notes on the Balemba. Journ. Anthr. Inst. 1931, p. 235.

⁴⁸ According to Junod, The Malemba draw-plate has several holes.

⁴⁹ *Schlömann*, Die Malepa in Transvaal. Verhandl. d. Berliner Ges. f. Anthropologie, Ethnologie u. Urgeschichte, p. 69. Berlin 1894.

⁵⁰ *H. Junod*, The Balemba of the Zoutpansberg (Transvaal), Folk-Lore XIX, p. 280. London 1908.

⁵¹ *C. Mauch*, Reisen im Inneren v. Süd-Afrika 1865-72. Petermanns Geogr. Mitteilungen, Erg. h. 37, p. 47. Gotha 1874.

⁵² *H. Junod*, Les Ba-Ronga, p. 239. Neuchatel 1898. See also Globus LXXIV (1898), p. 190 (after Junod).

⁵³ *A. Kranz*, Natur- und Kulturleben der Zulus, p. 67. Wiesbaden 1880

⁵⁴ *Chase*, Natal Papers, I, p. 6. Quoted by *W. C. Holden*, The past and future of the Kaffir races, p. 246. London 1866.

⁵⁵ *G. Tessmann*, Die Baja, p. 186. Stuttgart 1934.

⁵⁶ *C. K. Meek*, The northern tribes of Nigeria, p. 157. London 1925.

⁵⁷ *E. Foà*, Le Dahomey, p. 128. Paris 1895.

⁵⁸ *Dupuis-Jakouba*, Industries et principales professions des habitants de la région de Tombouctou, p. 38, fig. 12. Paris 1921. *W. B. Seabrook*, Den vite munken i Timbuktu, p. 202. Stockholm 1935.

⁵⁹ *M. Park*, Travels in the interior districts of Africa, p. 285. London 1879.

⁶⁰ *El Hage Abd Salam Shabeeny*, An account of Timbuctoo and Housa, etc., p. 215. London 1820.

⁶¹ *P. Eudel*, L'orfèvrerie Algérienne et Tunisienne, p. 502. Alger 1902. Baron G. Fleetwood, The Royal Armoury, Stockholm, has turned my attention to this work.

⁶² *M. W. Hilton-Simpson*, Among the hill-folk of Algeria, p. 83. London 1921.

⁶³ *R. P. Hommel*, China at work, p. 25 sq. New York 1937.

⁶⁴ *F. von Richthofen*, China, II, Berlin 1882.

⁶⁵ Cf., e. g., *H. Blümmer*, Technologie u. Terminologie d. Gewerbe u. Künste bei d. Griechen u. Römer. IV, p. 250. Leipzig 1884.

⁶⁶ *F. M. Feldhaus*, Die Technik der Vorzeit, d. geschichtlichen Zeit u. d. Naturvölker, p. 200, Leipzig 1914.

⁶⁷ *M. Ebert*, Reallexikon der Vorgeschichte. Berlin 1915.

⁶⁸ Quellenschriften f. Kunstgeschichte. Bd. 7, Buch 3, Kap. 8.

⁶⁹ Cf. *N. Keyland*, Sentrådsspining, tenndragning etc. hos lapparna i norra Jämtland, p. 148 sq. Fataburen. Stockholm 1920.

FIG. 1. WIRE-DRAWING IN AFRICA

1. Ancient Egypt.
2. Amhara.
3. Kaffa.
4. Unyoro.
5. Akikuyu.
6. Akamba.
7. Wanyika.
8. Wadjagga.
9. Masai.
10. Ruanda.
11. Karagwe.
12. Kiziba.
13. Usindja (Balongo).
14. Barundi.
15. Bafulero.
16. Banyabungu.
17. Wanyamwezi.
18. Konde.
19. Wakinga.
20. Moliro (village).
21. Babemba.
22. Mpweto.
23. Bayeke.
24. Vachokwe.
25. Bakuba.
26. "Moamba's village".
27. "Kapesha's village".
28. Basenga (Shinga).
29. "Nyasaland".
30. The s. end of L. Nyasa.
31. The Lower Shire.
32. Sena.
33. Tete.
34. Barotse.
35. Barolong.
36. Zimbabwe.
37. Balemba.
38. Bavenda.
39. Baronga.
40. Zulu.
41. Hausa.
42. Togo.
43. Accra.
44. Timbuktu, etc.
45. The town of Kamalia, Mandingo, etc.
46. Fez.
47. Shavia.
48. Algiers, Tunis, Tripoli, Alexandria, Cairo, Khartoum, and probably other North African towns.

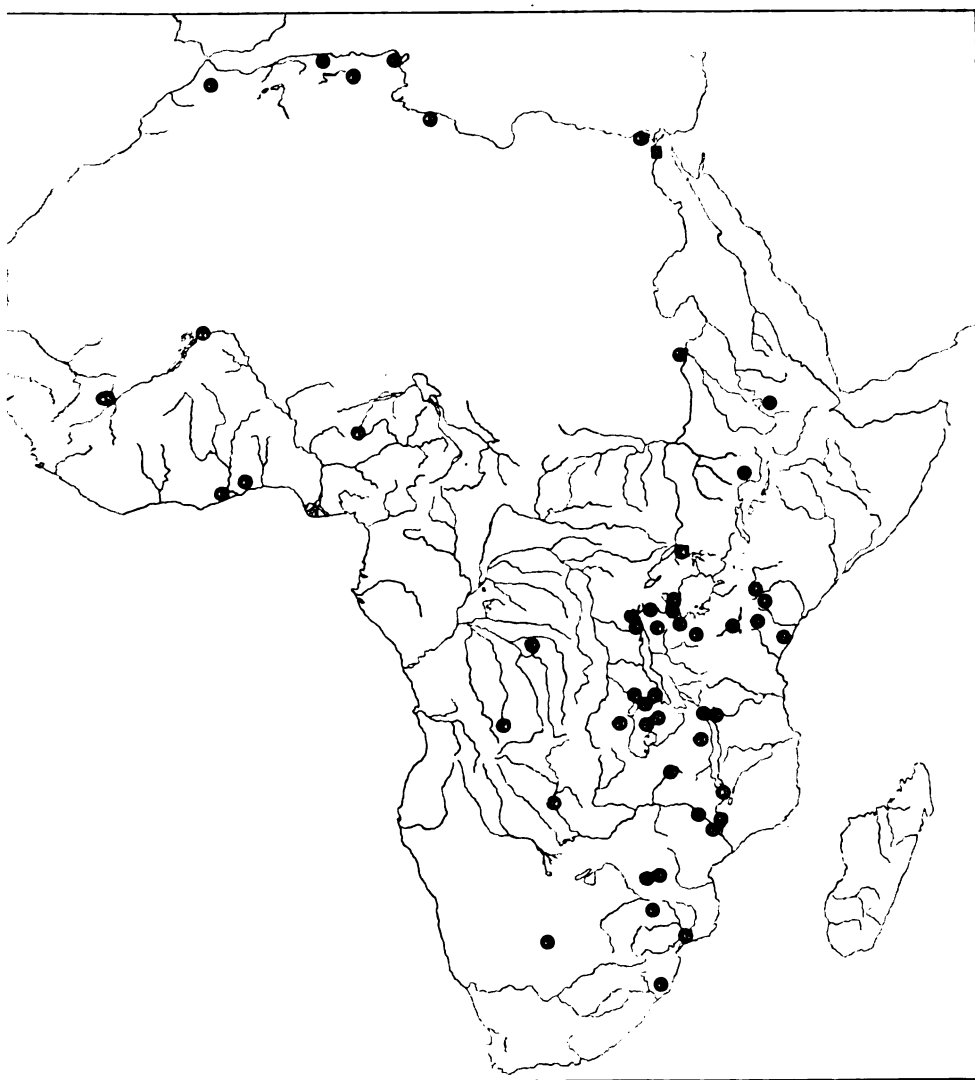


Fig. 1. Wire-drawing in Africa.



Fig. 2. Baluba man drawing wire at Moliro, Katanga, Lemaire, phot. 1898. (By courtesy of Dr. J. Maes).



Fig. 3. Bayeke men drawing copper wire. (By courtesy of Dr. J. Maes).

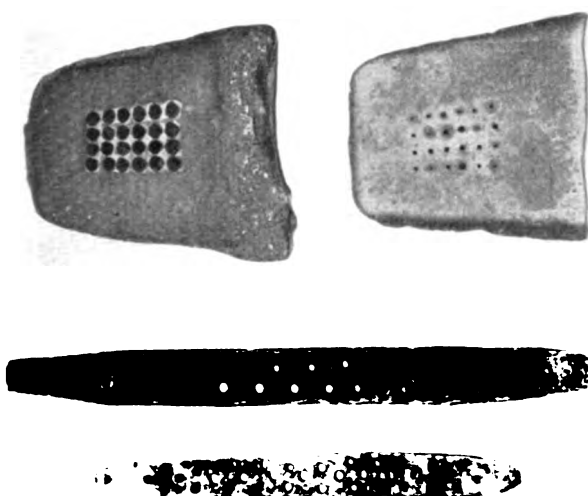


Fig. 4. Draw-plates of iron, Chahar Mongols, Inner Mongolia. The longest one measures 29.5 cm. The bottom right is seen from the back. (The collections of the Hedin expedition. The Ethnographical Museum, Stockholm).

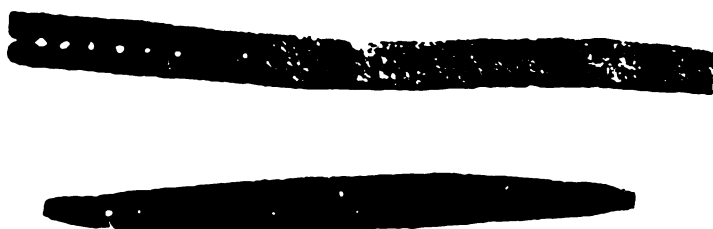


Fig. 5. Draw-plates of iron from the Viking era, Gotland (Slite). Statens Historiska Museum, Stockholm. (By courtesy of Dr. H. Arbman).

A D D E N D A

As the proofs of the present essay had already passed the press reader, the current issue of "Man" (February, 1939) came to my hand, and there I find (p. 17) an instance of the drawing of silver (alloy) wire from Obuasi, Ashanti, recorded by Capt. R. P. Wild. The wire-drawing gauge is of steel, and of European make, similarly to that of the Gold Coast (cf. above, p. 22). The fact of these implements nowadays, and probably since a long time back, being imported from Europe does not, however, necessarily preclude the possibility of their having formerly been locally manufactured.

Soto (Basuto) : "Ils travaillent aussi le cuivre et savent assez bien le filer". *E. Casalis*, Les Bassoutos, p. 174. Paris 1930.

